

Application Serial No. 10/700,138
Amendment dated August 26, 2004
Reply to Office Action of May 26, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (PREVIOUSLY AMENDED) A sealing system which forms spaced apart thermal seals along at least one moving web by contact of the moving at least one web with heated portions of sealing elements mounted on a sealing wheel during rotation comprising:

 seal forming elements which peripherally contact the at least one web to form the thermal seals by heat transfer to the at least one web; and wherein

 each seal forming element has an outer section, an inner section which contacts the sealing wheel and an intermediate section which includes thermal insulation which thermally insulates the outer section from the inner section; and

 an electrical heater wholly disposed on each outer section for heating said outer section to form seals in said web contacting said outer sections.

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2. (CANCELLED)

3. (CANCELLED)

4. (ORIGINAL) A sealing system in accordance with claim 1 wherein:

each seal forming element is radially adjustable to vary the spacing between the spaced apart thermal seals.

5. (CANCELLED)

6. (CANCELLED)

7. (ORIGINAL) A sealing system in accordance with claim 1 wherein:

each electrical heater comprises a film electrical resistance.

8. (CANCELLED)

9. (CANCELLED)

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10. (CANCELLED)

11. (CANCELLED)

12. (CANCELLED)

13. (ORIGINAL) A sealing system in accordance with claim 4 wherein:
each electrical heater comprises a film electrical resistance.

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18. (CANCELLED)

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19. (ORIGINAL) A sealing system in accordance with claim 1 wherein:
the outer section is parallel to an axis of rotation of the sealing wheel and the
electrical heater extends longitudinally along the outer section.

20. (CANCELLED)

21. (CANCELLED)

22. (ORIGINAL) A sealing system in accordance with claim 4 wherein:
the outer section is parallel to an axis of rotation of the sealing wheel and the
electrical heater extends longitudinally along the outer section.

23. (ORIGINAL) A sealing system in accordance with claim 7 wherein:
the outer section is parallel to an axis of rotation of the sealing wheel and each
electrical resistance extends longitudinally along the outer section.

24. (CANCELLED)

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43. (CANCELLED)

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47. (CURRENTLY AMENDED) A thermal sealing element in accordance with claim 43 comprising a support;

a film heating element having a resistance to which is applied electric current for generating heat to thermally seal film contacting the heating element; and

insulation separating the film heating element from the support;

wherein the insulation is a solid insulation layer which separates the film heating element from the support.

48. (CANCELLED)

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49. (CANCELLED)

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57. (ORIGINAL) A thermal sealing element in accordance with claim 47 wherein:
the film resistance varies along a length thereof.

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58. (CANCELLED)

59. (CANCELLED)

60. (CANCELLED)

61. (ORIGINAL) A thermal sealing element in accordance with claim 57 wherein:

the film resistance is comprised of a plurality of sections with at least two of the sections have a different resistance.

62. (CANCELLED)

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63. (ORIGINAL) A sealing system which forms spaced apart thermal seals along at least one moving web by contact of the moving at least one web with heated portions of an outside periphery of a sealing wheel during rotation comprising:

seal forming elements attached to the sealing wheel which peripherally contact the at least one web to form the thermal seals by heat transfer to the at least one web; and wherein each seal forming element has an outer section which peripherally contacts the at least one web and includes a film resistance electrical heater facing the at least one web and thermal insulation disposed between the outer section and the sealing wheel which insulates the outer section from the sealing wheel.

64. (CURRENTLY AMENDED) A sealing system in accordance with claim 63 wherein:

the seal forming elements comprise a first group which [(we)] are parallel to an axis of rotation of the sealing wheel, and

a second group which are disposed circumferentially on an outside periphery of the sealing wheel and are individually disposed between different pairs of adjacent seal forming elements of the first group.

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65. (CURRENTLY AMENDED) A sealing system in accordance with claim 64 wherein:

the first and second groups [[re]] are continuous and joined together.

66. (ORIGINAL) A sealing system in accordance with claim 63 wherein:

the film resistance is a thick film resistance which varies along a longitudinal dimension thereof.

67. (ORIGINAL) A sealing system in accordance with claim 66 wherein:

the thick film resistance of each sealing element is comprised of a plurality of sections of resistance with at least two of the sections being of a different resistance.

68. (ORIGINAL) A sealing system in accordance with claim 63 wherein:

the film resistance is a thick film resistance which varies along a longitudinal dimension of at least one of the first and second groups.

69. (ORIGINAL) A sealing system in accordance with claim 68 wherein:

the thick film resistance is comprised of a plurality of sections of resistance with at least two of the sections being of a different resistance in at least one of the first and second groups.

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70 (ORIGINAL) A sealing system in accordance with claim 64 wherein:

the film resistance is a thick film resistance which varies along a longitudinal dimension of at least one of the first and second groups.

71. (ORIGINAL) A sealing system in accordance with claim 70 wherein:

the thick film resistance is comprised of a plurality of sections of resistance with at least two of the sections being of a different resistance in at least one of the first and second groups.

72. (ORIGINAL) A sealing system in accordance with claim 65 wherein:

the film resistance is a thick film resistance which varies along a longitudinal dimension of at least one of the first and second groups.

73. (ORIGINAL) A sealing system in accordance with claim 72 wherein:

the thick film resistance is comprised of a plurality of sections of resistance with at least two of the sections being of a different resistance in at least one of the first and second groups.

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74. (ORIGINAL) A sealing system in accordance with claim 64 wherein:

the first group includes at least one section of resistance disposed between ends thereof which is wider than the resistance at the ends which produces a seal dividing a container defined between adjacent elements of the first group and an element of the second group into at least two sections with the at least one section of resistance which is wider between adjacent elements producing a seal defining an opening into one of the at least two sections.

75. (ORIGINAL) A sealing system in accordance with claim 65 wherein:

the first group includes at least one section of resistance disposed between ends thereof which is wider than the resistance at the ends which produces a seal dividing a container defined between adjacent elements of the first group and an element of the second group into at least two sections with the at least one section of resistance which is wider between adjacent elements producing a seal defining an opening into one of the at least two sections.

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76. (ORIGINAL) A sealing system in accordance with claim 66 wherein:

the first group includes at least one section of resistance disposed between ends thereof which is wider than the resistance at the ends which produces a seal dividing a container defined between adjacent elements of the first group and an element of the second group into at least two sections with the at least one section of resistance which is wider between adjacent elements producing a seal defining an opening into one of the at least two sections.

77. (ORIGINAL) A sealing system in accordance with claim 67 wherein:

the first group includes at least one section of resistance disposed between ends thereof which is wider than the resistance at the ends which produces a seal dividing a container defined between adjacent elements of the first group and an element of the second group into at least two sections with the at least one section of resistance which is wider between adjacent elements producing a seal defining an opening into one of the at least two sections.

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78. (ORIGINAL) A sealing system in accordance with claim 68 wherein:

the first group includes at least one section of resistance disposed between ends thereof which is wider than the resistance at the ends which produces a seal dividing a container defined between adjacent elements of the first group and an element of the second group into at least two sections with the at least one section of resistance which is wider between adjacent elements producing a seal defining an opening into one of the at least two sections.

79. (ORIGINAL) A sealing system in accordance with claim 69 wherein:

the first group includes at least one section of resistance disposed between ends thereof which is wider than the resistance at the ends which produces a seal dividing a container defined between adjacent elements of the first group and an element of the second group into at least two sections with the at least one section of resistance which is wider between adjacent elements producing a seal defining an opening into one of the at least two sections.

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80. (ORIGINAL) A sealing system in accordance with claim 70 wherein:

the first group includes at least one section of resistance disposed between ends thereof which is wider than the resistance at the ends which produces a seal dividing a container defined between adjacent elements of the first group and an element of the second group into at least two sections with the at least one section of resistance which is wider between adjacent elements producing a seal defining an opening into one of the at least two sections.

81. (ORIGINAL) A sealing system in accordance with claim 71 wherein:

the first group includes at least one section of resistance disposed between ends thereof which is wider than the resistance at the ends which produces a seal dividing a container defined between adjacent elements of the first group and an element of the second group into at least two sections with the at least one section of resistance which is wider between adjacent elements producing a seal defining an opening into one of the at least two sections.

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82. (ORIGINAL) A sealing system in accordance with claim 72 wherein:

the first group includes at least one section of resistance disposed between ends thereof which is wider than the resistance at the ends which produces a seal dividing a container defined between adjacent elements of the first group and an element of the second group into at least two sections with the at least one section of resistance which is wider between adjacent elements producing a seal defining an opening into one of the at least two sections.

83. (ORIGINAL) A sealing system in accordance with claim 73 wherein:

the first group includes at least one section of resistance disposed between ends thereof which is wider than the resistance at the ends which produces a seal dividing a container defined between adjacent elements of the first group and an element of the second group into at least two sections with the at least one section of resistance which is wider between adjacent elements producing a seal defining an opening into one of the at least two sections.

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84. (ORIGINAL) A sealing system which forms spaced apart thermal seals between at least two webs by contact of the at least two webs with heated seal forming elements comprising:
a pair of seal forming elements which contact opposed sides of the at least two webs to form the thermal seals by heat transfer to the at least one web; and wherein
each of the pair of seal forming elements has a first section which contacts one of at least two webs and includes a film resistance electrical heater facing one of the at least two webs and thermal insulation disposed between the first section and a second section which is spaced farther from the at least two webs than the first section with the seal forming elements having a closed periphery for containing a substance inside the closed periphery between the at least two webs.

85. (ORIGINAL) A sealing system in accordance with claim 84 wherein:
the resistance is a thick film resistance and the insulation is a plurality of slots located at different sides of each seal forming element with each slot providing an air gap between the film heating element and the second section.

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86. (ORIGINAL) A sealing system in accordance with claim 84 wherein:

the resistance is a thick film resistance and the insulation is a peripheral ring of thermal insulation extending around a periphery of each seal forming element.

87. (ORIGINAL) A sealing system in accordance with claim 1 wherein:

the electrical heater is a film resistance disposed on a surface of the outer section which contacts the at least one web.

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88. (PREVIOUSLY AMENDED) A sealing system which forms spaced apart thermal seals along at least one moving web by contact of the moving at least one web with heated portions of sealing elements mounted on a sealing wheel during rotation comprising:

seal forming elements which peripherally contact the at least one web to form the thermal seals by heat transfer to the at least one web;

each seal forming element having an outer section, on which is located at least one electrical heater, an inner section which contacts the sealing wheel and an intermediate section which includes thermal insulation which thermally insulates the outer section from the inner section;

each electrical heater being comprised of an electrical resistance disposed along a longitudinal dimension of the outer section of the seal forming element, the electrical resistance being distributed along the longitudinal dimension with a higher electric resistance being adjacent to a part of the intermediate section through which heat flows to the inner section and a lower electrical resistance which is disposed adjacent to the thermal insulation of the intermediate section; and wherein

the electrical heater is a film resistance disposed on a surface of the outer section which contacts the at least one web.

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89. (PREVIOUSLY AMENDED) A sealing system which forms spaced apart thermal seals along at least one moving web by contact of the moving at least one web with heated portions of sealing elements mounted on a sealing wheel during rotation comprising:

 seal forming elements which peripherally contact the at least one web to form the thermal seals by heat transfer to the at least one web;

 each seal forming element having an outer section, on which is located at least one electrical heater, an inner section which contacts the sealing wheel and an intermediate section which includes thermal insulation which thermally insulates the outer section from the inner section;

 each electrical heater being comprised of an electrical resistance disposed along a longitudinal dimension of the outer section of the seal forming element, the electrical resistance being distributed along the longitudinal dimension with a higher electric resistance being adjacent to a part of the intermediate section through which heat flows to the inner section and a lower electrical resistance which is disposed adjacent to the thermal insulation of the intermediate section;

 the inner section of each seal forming element is joined to upper and lower parts of the sealing wheel which are separated on an axis of rotation of the wheel;

 the higher electrical resistance is located proximate to the upper and lower parts of

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the wheel and the lower electrical resistance separates the higher electrical resistance

proximate to the upper and lower parts; and wherein

the electrical heater is a film resistance disposed on a surface of the outer section
which contacts the at least one web.

90. (ORIGINAL) A sealing system in accordance with claim 4 wherein:

the electrical heater is a film resistance disposed on a surface of the outer section
which contacts the at least one web.

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91. (PREVIOUSLY AMENDED) A sealing system which forms spaced apart thermal seals along at least one moving web by contact of the moving at least one web with heated portions of sealing elements mounted on a sealing wheel during rotation comprising:

seal forming elements which peripherally contact the at least one web to form the thermal seals by heat transfer to the at least one web;

each seal forming element having an outer section, on which is located at least one electrical heater, an inner section which contacts the sealing wheel and an intermediate section which includes thermal insulation which thermally insulates the outer section from the inner section;

each electrical heater being comprised of an electrical resistance disposed along a longitudinal dimension of the outer section of the seal forming element, the electrical resistance being distributed along the longitudinal dimension with a higher electric resistance being adjacent to a part of the intermediate section through which heat flows to the inner section and a lower electrical resistance which is disposed adjacent to the thermal insulation of the intermediate section;

each seal forming element being radially adjustable to vary the spacing between the spaced apart thermal seals; and wherein

the electrical heater is a film resistance disposed on a surface of the outer section which contacts the at least one web.

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92. (PREVIOUSLY AMENDED) A sealing system which forms spaced apart thermal seals along at least one moving web by contact of the moving at least one web with heated portions of sealing elements mounted on a sealing wheel during rotation comprising:

 seal forming elements which peripherally contact the at least one web to form the thermal seals by heat transfer to the at least one web;

 each seal forming element having an outer section, on which is located at least one electrical heater, an inner section which contacts the sealing wheel and an intermediate section which includes thermal insulation which thermally insulates the outer section from the inner section;

 each electrical heater being comprised of an electrical resistance disposed along a longitudinal dimension of the outer section of the seal forming element, the electrical resistance being distributed along the longitudinal dimension with a higher electric resistance being adjacent to a part of the intermediate section through which heat flows to the inner section and a lower electrical resistance which is disposed adjacent to the thermal insulation of the intermediate section;

 the inner section of each seal forming element being joined to upper and lower parts of the sealing wheel which are separated on an axis of rotation of the wheel; and

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the higher electrical resistance being located proximate to the upper and lower parts of the wheel and the lower electrical resistance separates the higher electrical resistance proximate to the upper and lower parts;

each seal forming element being radially adjustable to vary the spacing between the spaced apart thermal seals; and wherein

the electrical heater is a film resistance disposed on a surface of the outer section which contacts the at least one web.

93. (CANCELLED)

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98. (CANCELLED)

99. (CANCELLED)

100. (CANCELLED)

101. (CANCELLED)

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102. (PREVIOUSLY ADDED) Apparatus for sealing at least one film ply to another film
ply to at least partially form a chain of continuously moving, connected pouches, said
apparatus comprising:

a plurality of sealing elements, each including an outer sealing section one first
thermal mass and an inner section coupled to a wheel, together with other inner sections of
other outer sealing sections, said inner sections and wheel having a second thermal mass
greater than the thermal mass of an outer sealing section;

a heater wholly disposed on said outer sealing section for heating said outer sealing
section to engage and seal one said film ply to another when said one film ply is applied
thereto; and

means for thermally insulating said outer sealing section from said inner section.

103. (CURRENTLY CANCELLED)

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104. (CURRENTLY AMENDED) In a process of producing transverse seals of at least one film layer to another film layer, the steps of:

introducing said film layers onto a sealing element with a heater means of said element contacting at least one of said film layers;
energizing said heater means to produce a seal in said two film layers; and
isolating heat produced by said heater means from other components of said sealing element, and

A process as in claim 103 wherein said isolating step comprises at least partially separating said heater means from other components of said sealing elements by a space therebetween.

105. (CURRENTLY CANCELLED)

106. (CURRENTLY CANCELLED)